MITIGATIVE FEATURES FOR EXPLOSIVE CONTAINMENT ON THE CHEMICAL STOCKPILE DISPOSAL PROGRAM

BY
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ABSTRACT

Public Law 99-145 mandated that the Army dispose of the United States inventory of obsolete and deteriorating chemical weapons in the safest and most environmentally acceptable manner. The Chemical Stockpile Disposal Program (CSDP) was created by the Department of Defense (DOD) to accomplish this mission. The CSDP encompasses reconfiguration, transportation, disassembly, and incineration of deteriorated chemical munitions utilizing state-of-the-art facilities and techniques. The disposal of these munition must be accomplished in strict accordance with all current environmental regulations and under vast public scrutiny. The CSDP has implemented many mitigative measures in order to increase safety and to alleviate public concern in the event of an accidental detonation within these facilities.

PROGRAM BACKGROUND

Chemical weapons have been in existence since World War I. The first chemical agents consisted of blister agents (vesicants) commonly known as mustard and lewisite gases. Later, nerve agent VX, Sarin (GB), and Tabun (GA) were developed. Chemical agents in the current inventory are from 24 to 47 years old. These chemical agents are loaded into a multitude of delivery systems such as M55 rockets, mortars, projectiles, land mines, and bombs. Approximately 60 percent of the inventory is contained in bulk ton containers. Table 1 shows the agent types and munition delivery configurations within the United States inventory. The United States has eight sites within the continental United States (CONUS) which store chemical munitions and bulk containers. Six of these sites, Tooele Army Depot, Tooele, Utah; Anniston Army Depot, Anniston, Alabama; Umatilla Depot Activity, Umatilla, Oregon; Pine Bluff Arsenal, Pine Bluff, Arkansas; Pueblo Depot Activity, Pueblo, Colorado; and Lexington-Bluegrass Army Depot, Lexington, Kentucky, contain explosively configured chemical munitions. The remaining two sites, Newport Army Ammunition Plant, Newport, Indiana, and Aberdeen Proving Ground, Aberdeen, Maryland, store only bulk containers. Figure 1 shows the United States storage locations and the quantity of munitions by weight of chemical weapons stored on these sites as a percentage of the total inventory.

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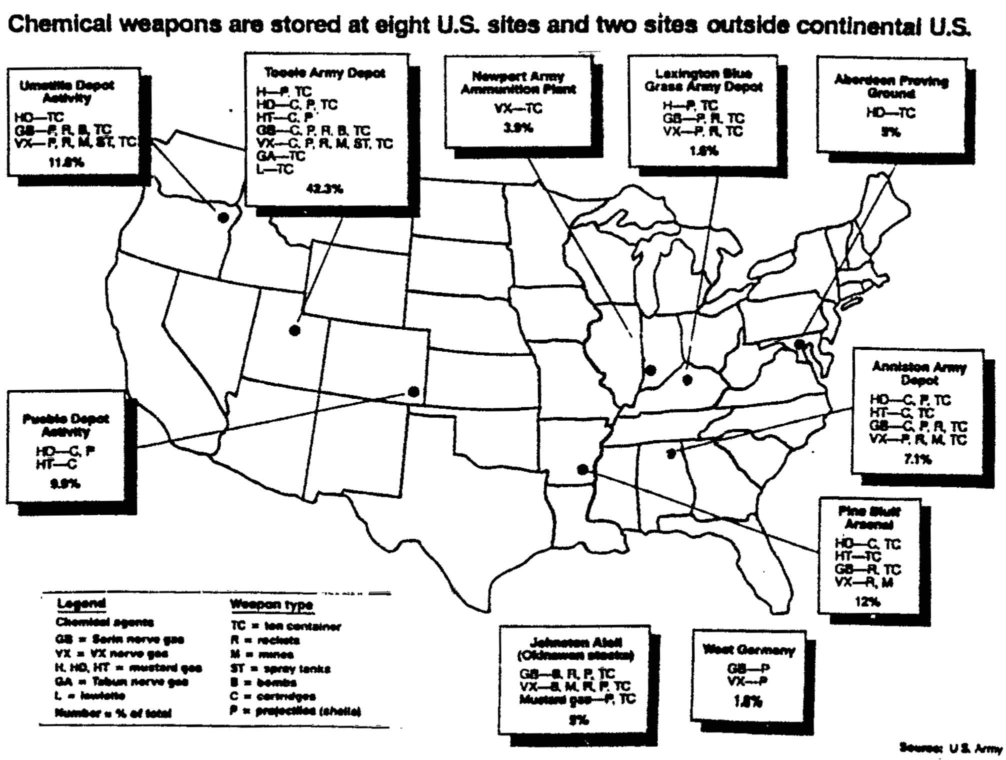
Table 1. Chemical munitions stored in the continental U.S.

Chemical munitions/agent	APG	ANAD	LBAD	NAAP	PBA	PUDA	TEAD[a]	UMDA
Mustard agent (H, HD, or HT)								
105-mm projectile (HD)		X				X		
155-mm projectile (H,HD)		X	X			X	X	
4.2-in. mortar (HD,HT)		X				X	X	
Ton container (HD)	X	X			X	X[b]	X	X
Ton container (HT)					X			
Agent GB								
105-mm projectile		X					X	
155-mm projectile		X					X	X
8-in. projectile		X	X				X	X
M55 rocket		X	X		X		X	X
500-lb bomb								X
750-lb bomb							X	X
Weteye bomb							X	
Ton container		X[b]	X[b]		X[b]		X	X[b]
Agent VX								
155-mm projectile		X	X				X	X
8-in. projectile							X	X
M55 rocket		X	X		X		X	X
M23 land mine		X			X		X	X
Spray tank							X	X
Ton container				X				X[b]

[a]Small quantities of Lewisite (L) and tabun (GA) are stored in ton containers at TEAD.
[b]Small quantities of agent drained as part of the DATS/M55 assessment.

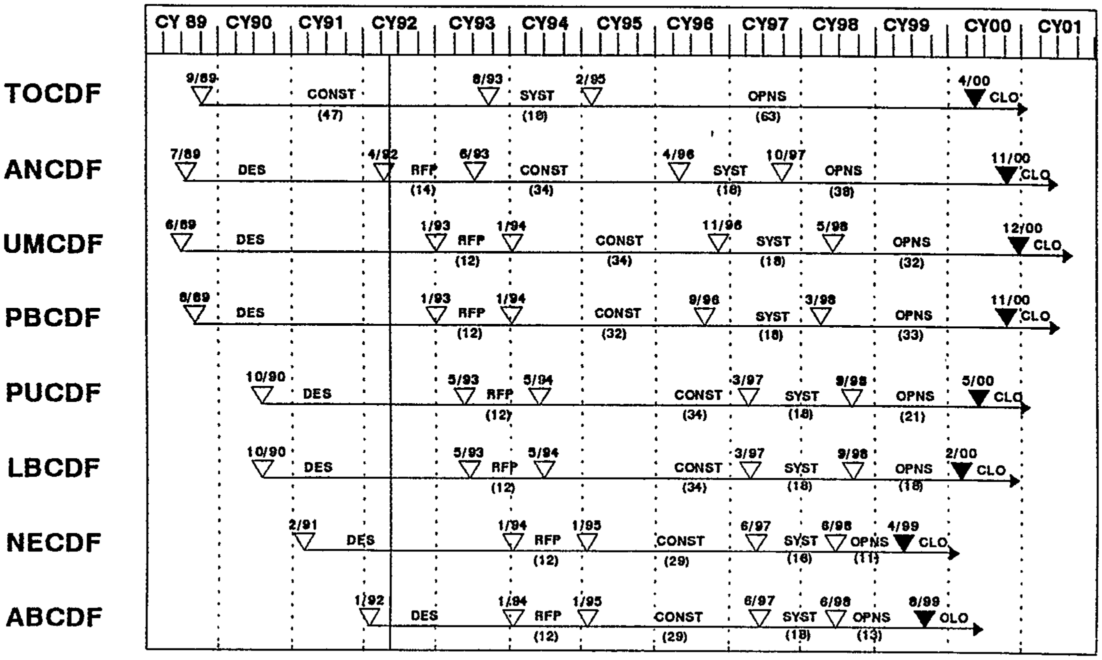
Figure 1. U.S. chemical weapons storage sites



Program Implementation History

The United States commitment to destruction of chemical weapons began in 1975 with the signing of the Geneva Protocol. In 1985, Congress passed Public Law 99-145, the Defense Authorization Act of 1986, which mandated the destruction of the entire United States inventory of obsolete and unserviceable chemical weapons by 1994. In June of 1990, the United States and the former Soviet Union signed a bilateral agreement to destroy their entire stockpiles of chemical weapons. This agreement, although never ratified, stated that 50 percent of the United States stockpile of chemical weapons would be destroyed by December 1999, followed by all but 5,000 metric tons by May 2002. Thus, Public Law 99-145 was amended to direct the DOD to complete destruction of the entire United States inventory by September 1999. The current programmatic schedule is shown in Figure 2.

Figure 2. Chemical Demilitarization Program implementation schedules



In order to execute this mission, the Secretary of Defense created an organization now known as the Program Manger for Chemical Demilitarization (PMCD), headquartered in Edgewood, Maryland. The PMCD falls under the direct command and control of the Assistant Secretary of the Army (Installations, Logistics, and Environment). The U.S. Army Corps of Engineers serves as the Life Cycle Project Manager and the PMCD Facility Design and Construction Agent for the CSDP. The U.S. Armament and Material Command (AMCCOM) acts as the contracting agent for the Army.

DESTRUCTION TECHNOLOGY

Until 1969, the Army disposed of chemical weapons by techniques such as open-pit burning, evaporation, burial, and ocean dumping. During the early 1970's, the DOD studied chemical weapon disposal technologies such as chemical neutralization and incineration. All of the technologies studied eventually resulted in some component of the chemical weapon being incinerated. This, along with other problems such as the deterioration of the GB filled M55 rockets, led the Army to focus on incineration as the technology for destruction of chemical weapons. During the late 1970's, the Army created the Chemical Agent Munitions Disposal System (CAMDS) located in Tooele, Utah. This facility still serves as the Army test and evaluation location for much of the specialized demilitarization process currently being utilized in the CSDP designs.

The current Army demilitarization technology consists of a reverse assembly process whereby live chemical munitions are brought to the Munitions Demilitarization Building (MDB) and remotely dismantled within explosive containment rooms (ECR's) by highly specialized robotic equipment. The MDB is operated under a cascading negative pressure ventilation system with respect to atmospheric pressure. This ventilation system is the primary means by which containment of chemical agent vapors resulting from the disassembly process is maintained. Once dismantled, components of the munitions are incinerated in one of four types of incinerators.

The demilitarization process begins by loading munitions into highly specialized on-site containers (ONC's) within the chemical weapons storage area. The use of the ONC evolved from public concern over the ability of the Army to safely transport live chemical munitions, even over relatively short distances (a few miles). These containers can be compared to transport containers used to convey nuclear materials in that they must survive drop, crash, fire, and pressure tests and maintain their integrity as a containment vessel.

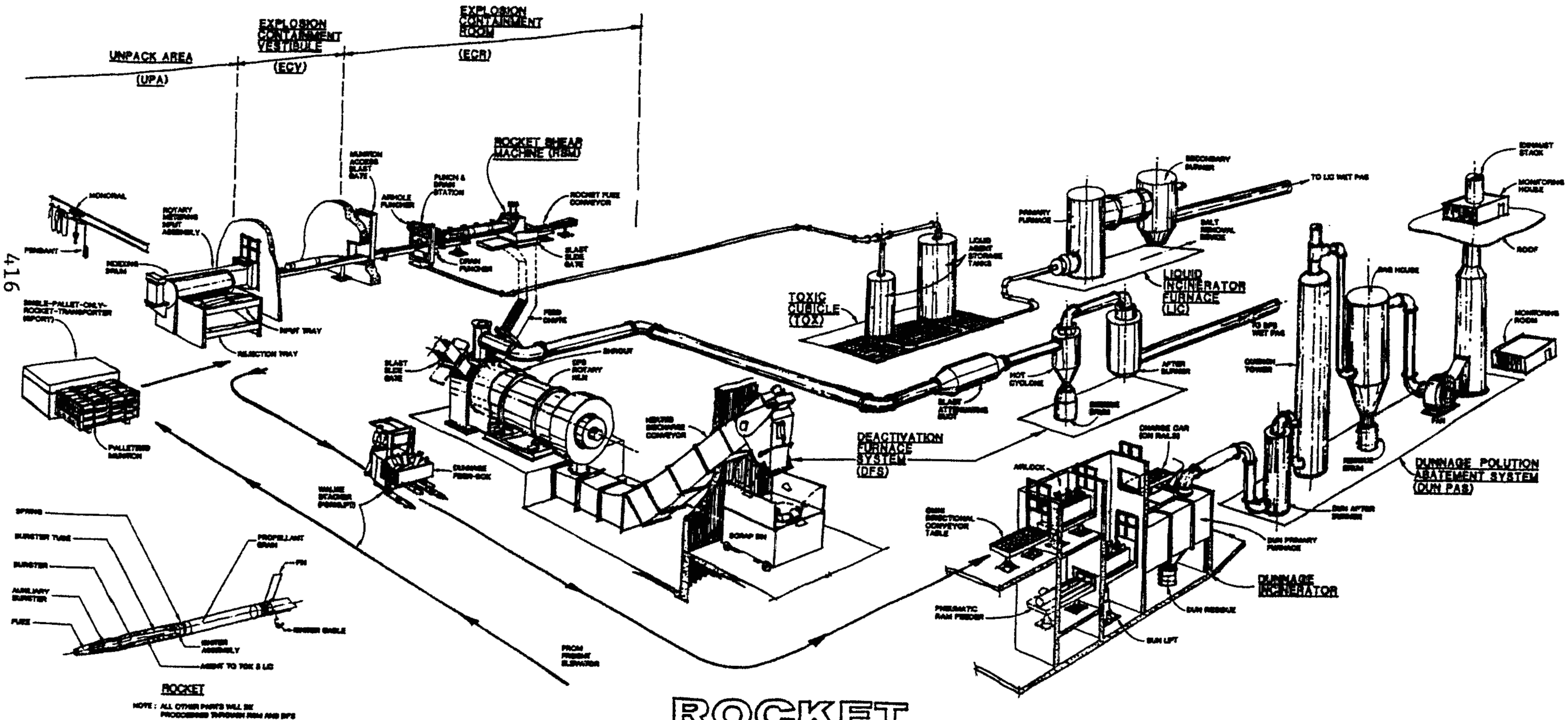
Once loaded into the ONC, munitions or containers are transported into the adjacent Chemical Stockpile Disposal Facility site. The ONC's are off-loaded at the Container Handling Building (CHB) where they are held for processing. The CHB is separated from the MDB by a 200-foot-long corridor which provides for intraline separation. When the ONC is needed for processing, it is conveyed down the corridor and raised to the second floor transition area where it is monitored for leaks, opened and unpacked. Pallets of munitions are then conveyed into

the unpack area (UPA) room where they are manually separated from the packing material (dunnage) and placed on munition conveyors for disassembly in the containment rooms. Dunnage resulting from unpack operations is conveyed down to the first floor via a lift enclosure and ram-fed into the dunnage incinerator.

Each munition type follows a disassembly process specific to the munition configuration. All energetic materials are removed from the munitions in the ECR's. Each munitions demilitarization building has two functionally identical ECR's. Once inside these rooms, explosives are separated from the munition and/or reduced in size and fed into the deactivation furnace room which is located beneath the containment rooms. Liquid nerve agent is siphoned out of munitions either in the containment room or the munitions processing bay (MPB). Agent, which is removed from the munition body or ton container, is collected in tanks within the toxic cubicle (TOX) on the first floor and incinerated in the liquid incinerator (LIC). Munitions bodies and ton containers which contain small portions of residual liquid agent after draining operations are thermally decontaminated in the metal parts furnace (MPF). The detailed description of disassembly process for each explosively configured munition are discussed below.

Rocket Processing

The M55 rocket is unique to the chemical munition stockpile in that all components are encased in a fiberglass shipping/ firing tube that contains both the rocket propellant and the liquid chemical agent. A schematic of the rocket processing line is shown in Figure 3. The M55's are manually loaded onto the rocket input conveyors in the UPA. Their orientation is checked and the input blast gate to the ECR is opened. Once inside the containment room the rocket is advanced to the rocket drain station (RDS) on the rocket shear machine (RSM). The input blast gate is shut to afford containment in the event of an accidental detonation. The rocket is punched at the RDS and agent is drained into TOX. When the draining operation is complete, it is indexed into the shearing station and another rocket enters the containment rooms. Only two rockets are allowed to enter the containment room, one in the drain station and one in the shear station. At the shearing station the rocket firing tube is sheared into segments. Sheared segments fall onto a blast gate mounted on the ECR floor. This gate cycles open and the explosive burster/propellant fall onto a flapper gate. The upper gate is closed and the lower flapper gate allows the energetics to fall into the deactivation furnace system (DFS). These gates provide category I protection to personnel that may be performing maintenance or changeout of equipment in the opposite ECR. They also control feed into the furnace. They also prevent a blast in either the containment room or the furnace room below from propagating into the other room.



ROCKET PROCESSING

Mine Processing

The land mines which contain chemical agent also pose a unique problem in that they are packaged three to a drum. Between each mine is packing material which makes it difficult to detect leaks. For this reason all mines are unpacked in a glove box adjacent to the UPA and conveyed into the ECRs through the blast gate. When the first mine enters the ECR it is oriented in the first station of the mine machine for punching and draining. Once agent is drained, it is moved to the next station and a second mine enters the containment room through the blast gates. The next station removes the booster charge by pushing it from the mine and punching a hole in the charge. The booster charge is then dropped onto the upper blast gate and fed into the furnace below. The mine body with the remaining main explosive charge, burster pellet, and M48 charge are then segregated onto conveyors and fed into the furnace through the feed chute gates.

Projectile Processing

Each different type of projectile will be processed in a separate campaign. The projectile processing line is shown in Figure 4. Projectiles and mortars are loaded into the projectile/mortar rotary metering input system in the UPA and fed into the ECR's through the projectile blast gates. After entering the ECR the projectiles are conveyed to the projectile mortar disassembly machine (PMD). This machine has three stations where the lifting plug or fuse is removed and deposited onto a conveyor for incineration in the DFS. The next station removes any supplementary charge such as bursters. Depending on the burster size, some bursters will be conveyed to a burster size reduction (BSR) machine and reduced in size prior to being fed into the DFS. For all projectiles, except the 8-inch, three munitions will be in the containment room at one time. Because more than one 8-inch projectile will exceed the explosive limit of the containment room, only one 8-inch projectile is processed at a time. Once all energetics are removed from the projectile they are conveyed out of the ECR through the output blast gates and into the munitions corridor where they are loaded onto munitions trays. From there they are conveyed into the munitions processing bay (MPB) where they are punched and drained utilizing other specialized demilitarization equipment. Once punched and drained, the projectile bodies are fed into the metal parts furnace for thermal decontamination.

Other Chemical Weapon Configurations

Spray tanks, ton containers, and bombs are not explosively configured in the U.S. stockpile. The ECR's are not utilized for processing these munitions. They are instead conveyed directly to the MPB where they are punched and drained.

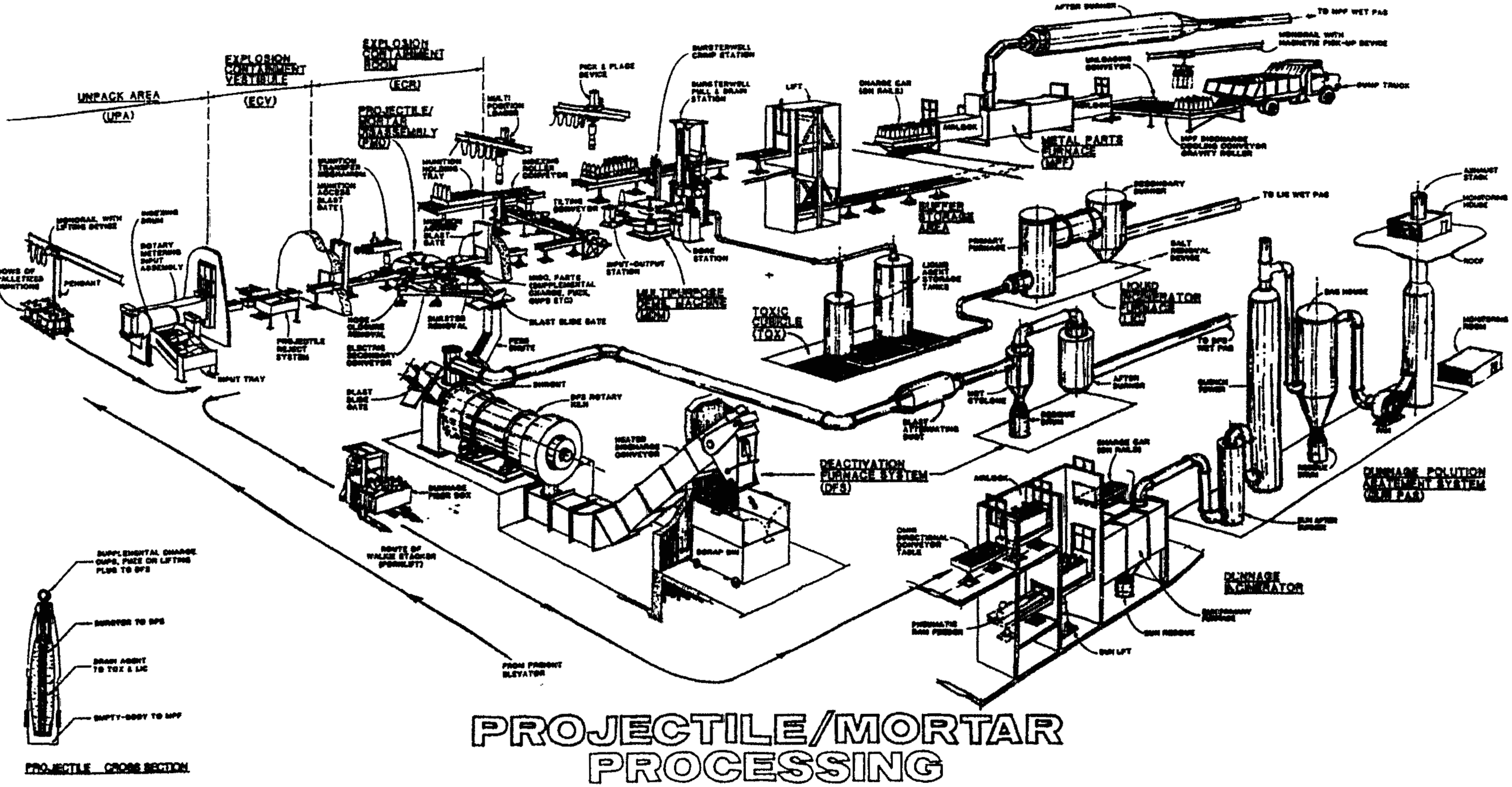


Figure 4. Projectile Processing Schematic

EXPLOSIVE CONTAINMENT

Introduction

Removal and incineration of all energetics from live chemical munitions occurs within blast containment areas in the MDB. The CSDP explosive containment areas consist of two functionally identical ECR's located on the second floor of the MDB. Incineration of all explosives occurs within the DFS located within a blast containment room on the first floor of the MDB. An isometric view of the blast containment structure is shown in Figure 5. It should be noted that only the DFS room and the ECR's are designed as blast containment rooms. The toxic cubicle room and the spent decon system (SDS) room are included on the blast containment structure foundation mat due to seismic considerations.

Functional Requirements:

Because of the hazardous operations performed on explosively configured munitions within the MDB, all personnel must be afforded category I protection from blast and fragment effects for the maximum credible event (MCE) in accordance with DOD 6055.9-std. Since separation distances are not achievable within the confines of the MDB, total containment of blast and fragmentation effects and near total vapor containment is required. Specific functional requirements for the ECR's and the DFS room are discussed individually in the following paragraphs.

Explosive Containment Rooms: Figure 6 shows a plan view of the second floor ECR area. The rocket shear machine, projectile/mortar disassembly machine, and the mine machine are located in these rooms during respective campaigns. In each ECR there are two process input conveyors and a single output conveyor, two personnel entry doors, several utility penetrations and a floor penetration for gravity feed of munition components into the DFS. Blast and fragment resistant closures are provided in each duct at the containment wall penetration. Each ECR must provide complete containment from blast and fragment effects and near total containment of the contaminated gaseous by-products escaping after an incident. Containment must be maintained until the confined gas products cool and internal pressure decays to a level where they may be processed through the ventilation system. Following the MCE, the ECR's will be reusable with minor refurbishment. The total blast environment, which the containment structure must resist, includes high pressure shock waves, quasi-static gas pressure, and primary and secondary fragments. The explosive limit of the ECR's are based upon the maximum amount of explosive present in the room during processing

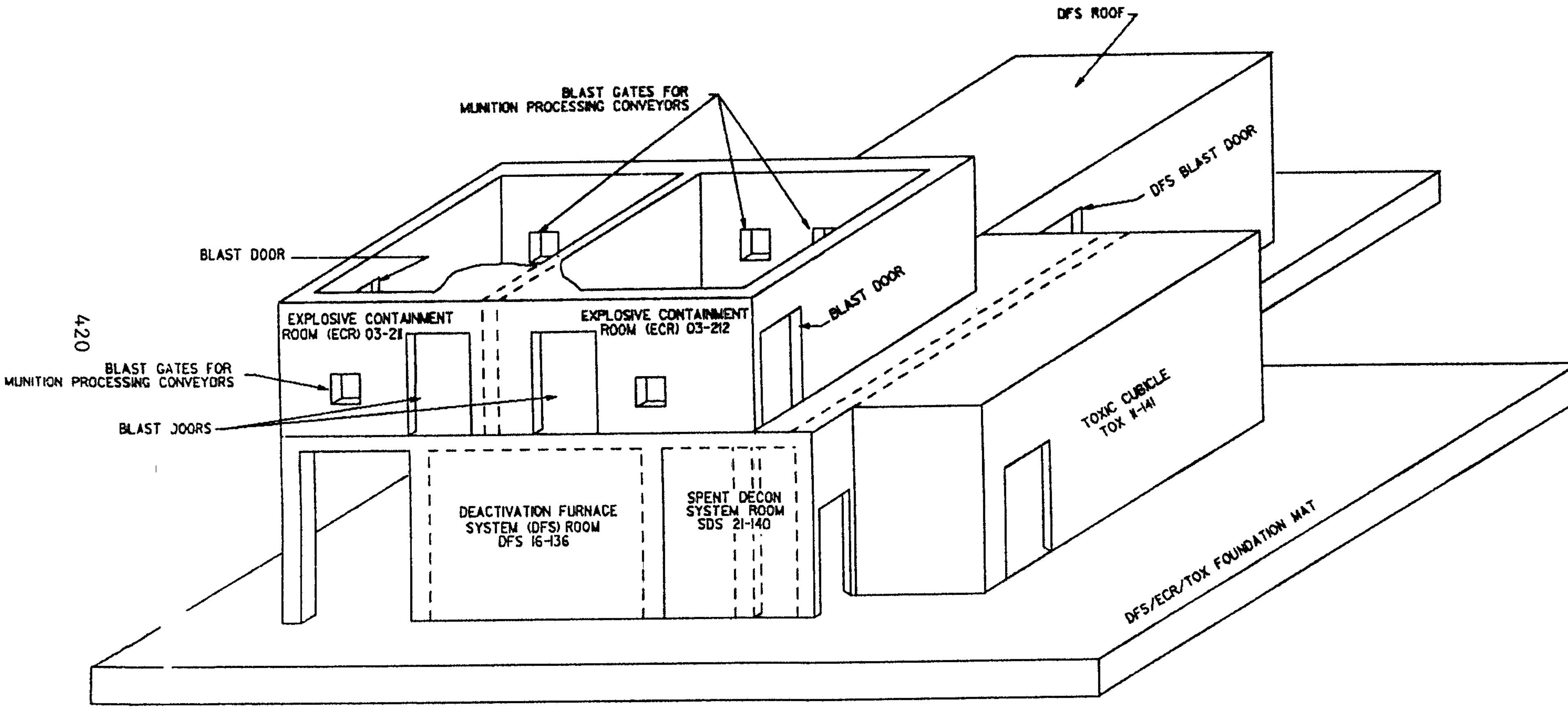


Figure 5. Isometric of blast containment structure

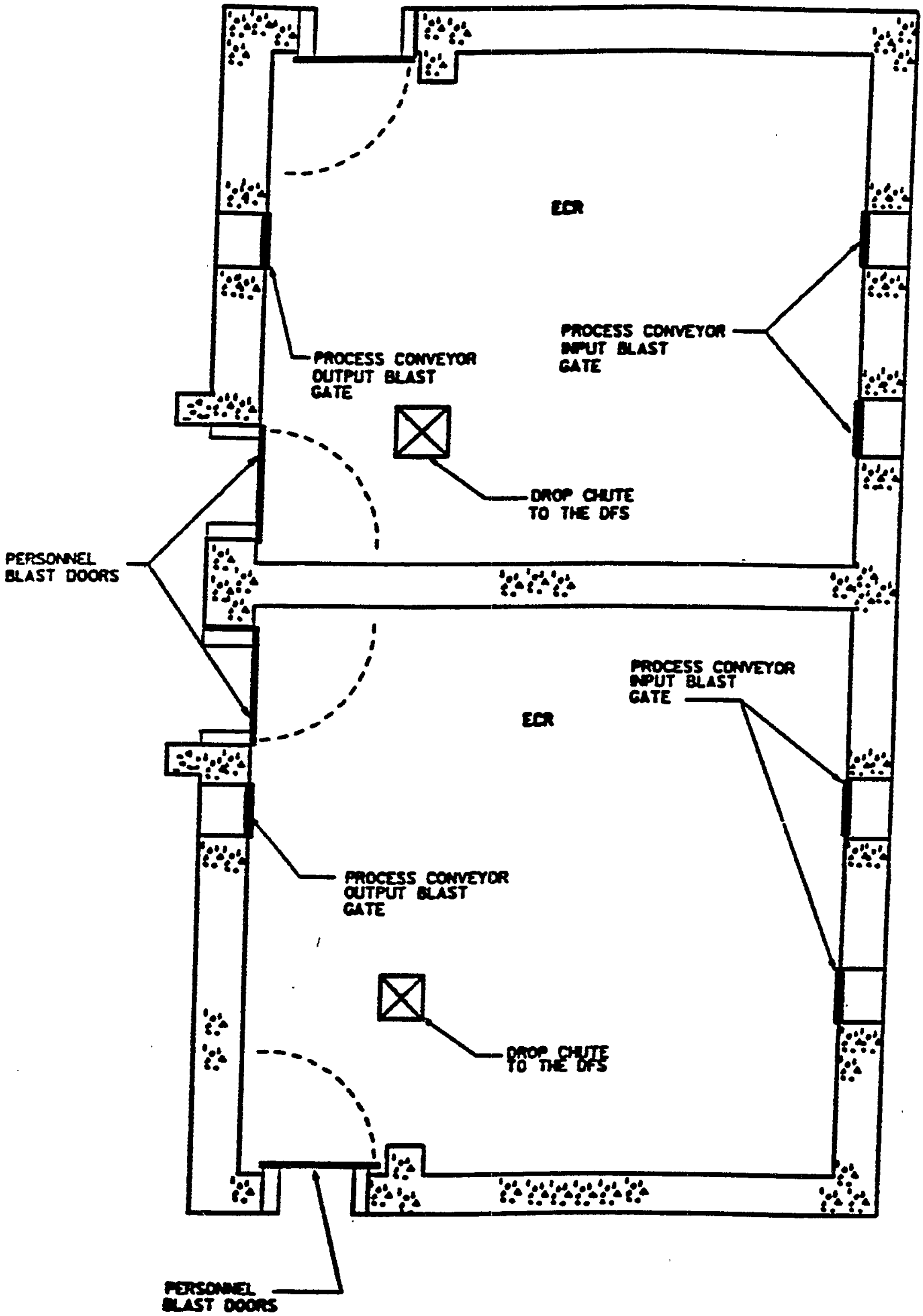


Figure 6. Containment room plan view

and the maximum amount of agent present in any one munition. It is assumed in the containment room design that all of the chemical agent present in the affected munition contributes to the blast pressure during the MCE. All explosive weights are increased by a 1.25 safety factor. The shock phase peak pressure is calculated using 15 lb. TNT as the MCE which equates to 18.75 lb. with the safety factor. In addition to the safety factor, the explosive weight for calculating shock pressures is increased by another factor of 1.25 to account for the contribution of agent combustion to this phase of the blast wave. The quasi-static blast loading results from the detonation of the munition and combustion of all of the agent in the munition. Quasi-static pressure resulting from the MCE is shown in Table 2.

Table 2. ECR quasi-static pressures for various munitions

Munition Type (Quantity)	Agent	Quasi-Static Pressure (psia)
M55 Rocket (1)	VX	42.08 (59.19)[a]
M23 Land Mine Drum)	VX	41.33
4.2-inch Mortar (1)	HT	23.81
105-mm Projectile (1)	GB	18.43
155-mm Projectile (1)	HD	31.48
M426 8-inch Projectile (1)	VX	56.35

Note: [a]Number in parentheses includes propellant burn.

Fragmentation Considerations: Chemical munitions are designed for optimum dispersion of agent rather than for fragmentation. The actual worst-case fragment mass for the containment rooms was determined from actual arena testing. All surfaces of the ECR structure are considered to be exposed to the worst-case fragment. Fragmentation shields for all penetrations are provided. All munition fragments in the DFS room originate within the furnace retort. The retort shell will confine and attenuate these fragments. In the event of a failure of the retort itself, calculations have shown that fragments are large, have low velocities, and are neither a consideration for the fragment design nor a fragment hazard to the DFS structure. The worst-case combination of blast load and fragmentation is shown in Table 3.

Table 3. Combined quasi-static and fragment penetration

Munition	Quasi-Static Pressure (psia)	Fragment Penetration (in) Concrete	Steel
M55 Rockets	42.08 (59.19)[a]	1.2	0.2
M23 Mine	41.33	18	2.4
M426 8-inch Projectile	56.35	12.2	2.3

Note: [a]Number in parentheses includes propellant burn.

Note: Minimum Wall Thickness = 25 inches (non-spall)

Deactivation Furnace System Room: After explosive components are removed from the munitions in the ECR's they are gravity fed to the rotary kiln through a blast resistant feed chute assembly. A section through the ECR and DFS rooms is shown in Figure 7. The energetic materials and related metal components in the DFS room are confined to the furnace retort. Explosives are completely incinerated and metal parts thermally decontaminated as they travel the length of the retort. Penetrations in the DFS room include one personnel door, one equipment door, two feed chutes from the ECR's above, utility penetrations, and a heated discharge conveyer. Blast hardened closures are provided for all these penetrations. In addition, an air supply and exhaust duct and a duct to the pollution abatement system (PAS) also penetrate the structure. Blast valves are provided for the ventilation intake and exhaust ducts. The duct to the PAS includes a blast attenuation duct to reduce shock pressures and act as a vent for quasi-static pressures. In the event of an explosive incident in the DFS retort, all blast and fragment effects are contained. The DFS room is also reusable with minor refurbishment after the MCE. The explosive limit of the DFS room is determined from a TNT equivalent of 28.2 lb. TNT increased by a 1.25 safety factor. This quantity is again increased by 1.25 to calculate shock pressures in order to account for enhancement of the shock pressure due to agent combustion.

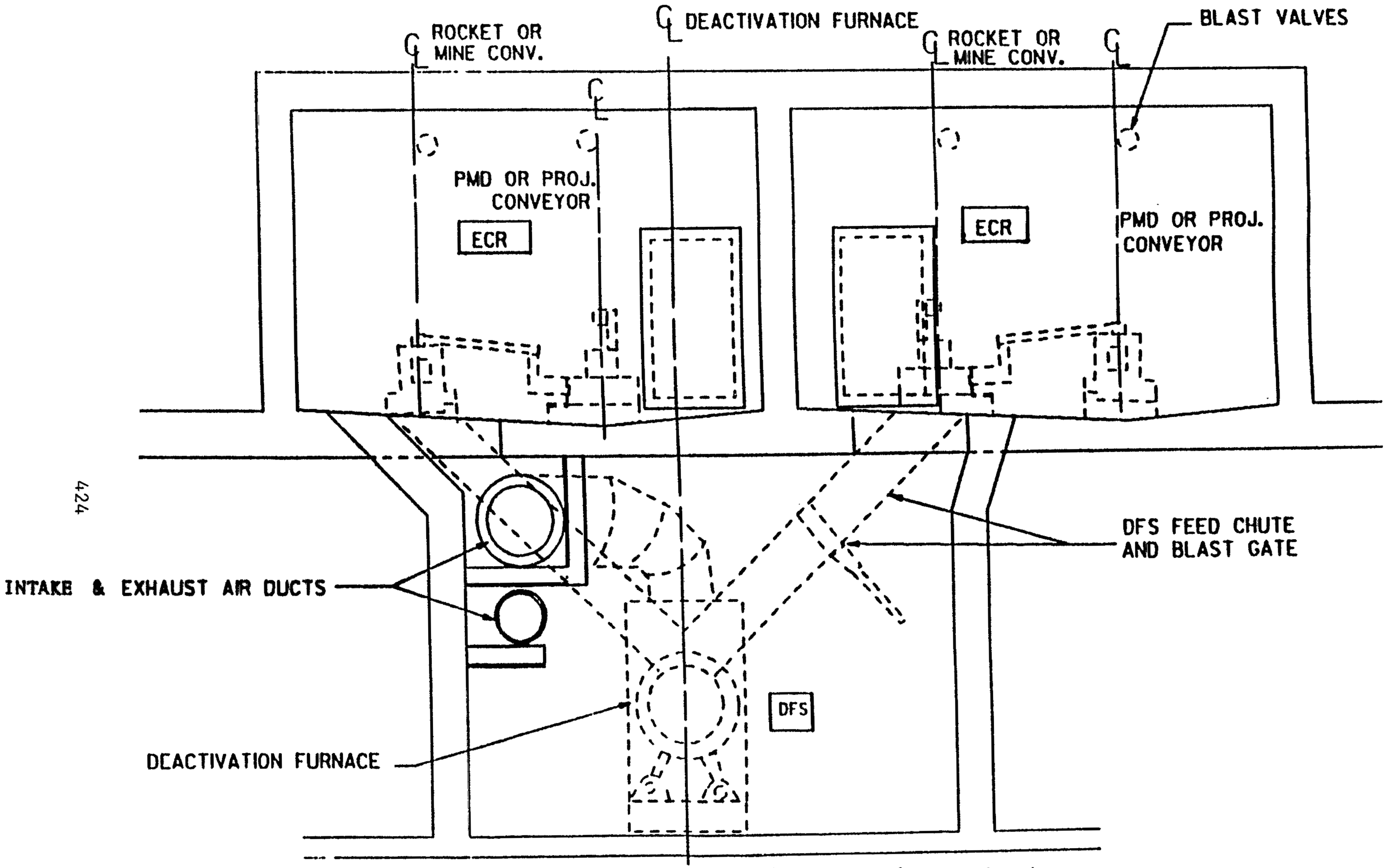


Figure 7. Section through blast containment structure

ADDITIONAL CONTAINMENT DESIGN CONSIDERATIONS

The requirement that the ECR function as a nonventing containment structure results in several additional criteria which would not normally be of significance for structure which vents rapidly. Pressure decay in a full containment structure, such as the ECR, is a function of two characteristics--structure leakage and the rate at which the confined hot gas products cool after an incident.

Ventilation System Blast Protection: Both the ECR and the DFS rooms have ventilation systems which function during normal process operations. In the event of an explosive incident, the ventilation ducts must be quickly isolated to prevent damage to them and the filter system downstream. This protection is achieved by using a fast-acting blast valve, followed by a gas-tight (isolation) valve. The maximum shock pressure rating of the blast valve is based on the maximum shock and quasi-static pressures resulting from a maximum credible event. The low pressure threshold must consider incidents such as a single projectile or mine. The gas valve provides assured closure capabilities for hazardous occurrences below the threshold of the blast valve such as a fire. Because even a "fast" blast valve has a finite closure time, some short duration shock will pass the blast valves and enter the ventilation ductwork. The ducting is designed to accommodate this transient load. Filters are located far enough away for shocks to decay, through the duct length and numerous bends, to an acceptable overpressure (less than 1 psi) at the filter.

Testing: The blast containment rooms within the MDB are reinforced concrete designed in accordance with TM 5-1300. Upon completion of construction the gas tightness of the ECR's will be quantified by performing a pneumatic leak test. This test will involve pressurization of the ECR's to 15 psig and measuring leakage to assure compliance with criteria.

CONCLUSION

Explosive containment features throughout chemical demilitarization facilities are conservatively designed to meet the most stringent conditions that could occur in the facility during processing. Containment of blast, fragment, and agent vapor resulting from an accidental detonation is assured by the conservative design approach, high quality construction to known standards, and post-construction testing. Personnel safety and agent containment are the foremost criteria utilized for demilitarization facility designs. Incineration of these munitions within the current technology environment provides the most expeditious and safest process for complete destruction of all components of the United States chemical weapon stockpile.

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INTRODUCTION

DISCOVERY OF MUSTARD GAS (LIQUID FORM)

CONGRESSIONAL LETTER

FORMATION OF USACMDA

MISSION OF USACMDA:

OVERSEE AND OPERATE CHEMICAL DEMILITARIZATION PROGRAM

TO ACCOMPLISH THE MISSION:

DEVELOP OVERALL PROGRAMMATIC PLANS

PRIORITIZE THE EFFORT FOR 200 POTENTIAL SITES

OTHER RANKING SYSTEMS

CERCLA "SUPERFUND" HAZARD RANKING SYSTEM

RCRA CORRECTIVE ACTION PRIORITIZATION

MIXED MATERIAL SITES (UXO/CSM/HTW)

(SOIL EXCAVATION ONLY)

UXO = UNEXPLODED ORDNANCE

CSM = CHEMICAL SURETY MATERIALS

HTW = HAZARDOUS & TOXIC WASTES

PRESENTATION OBJECTIVE

TO STIMULATE INTEGRATED CONCEPTUALIZATION OF POSSIBLE PRIORITIZATION AND RANKING SYSTEMS

PHILOSOPHY OF SAFETY PROFESSIONALS

VS

PHILOSOPHY OF RISK ASSESSORS

SAFETY PROFESSIONAL: PREVENT UNSAFE EVENT FROM OCCURRING

RISK ASSESSOR: EVALUATE RISKS ASSOCIATED WITH ALL POSSIBLE EVENTS

CRITICAL FACTORS TO BE CONSIDERED WHEN DEVELOPING A HAZARD RANKING SYSTEM

DETAILED SITE HISTORY

CONTAINERIZATION OF THE UXO

FUZING, ARMING AND PHYSICAL CONDITION

CHEMICAL NATURE OF MAJOR CONSTITUENTS (REACTIVITY/FLAMMABILITY)

ENVIRONMENTAL BEHAVIOR OF UXO/CSM/HTWs

CHARACTER & DISTRIBUTION OF POTENTIAL RECEPTORS

RISK ASSESSMENT CONCEPTS

RISK = EXPOSURE X HAZARD

RISK = DOSE X TOXICITY

RISK REQUIRES BOTH AN EXPOSURE (DOSE) AND A HAZARD (TOXICITY)

AN EXPOSURE (DOSE) REQUIRES A COMPLETED EXPOSURE PATHWAY

PRESENTATION FEATURES

STRUCTURED TO DETAIL UNIQUE CHARACTER OF UXO/CSM/HTW SITES

CONSIDERS COMPONENTS OF EXPOSURE PATHWAY USING RISK ASSESSMENT CONCEPTS

LISTS SUGGESTED SCORING FACTORS

DESCRIBES A "FIRST PASS" HRS

SITE CHARACTERIZATION

1. SITE RECORDS REVIEW & SURVEY TO DEVELOP SITE HISTORY/BACKGROUND.

2. PAST INVESTIGATION REPORTS/FUTURE INVESTIGATIONS

3. PHYSICAL, CLIMATOLOGICAL & HYDROGEOLOGICAL CHARACTERIZATION

4. POTENTIAL RECEPTOR ANALYSIS

5. FUTURE LAND USE STUDY

6. REGULATORY HISTORY

7. EVALUATION OF SOCIAL-POLITICAL FACTORS DEFINING SITE SENSITIVITY

EXPOSURE PATHWAY COMPONENTS

1. DETAILED RISK ASSESSMENT CONCEPTS

ELEMENTS OF THE EXPOSURE PATHWAY:

A. HAZARDOUS CONSTITUENT (UXO/CSM/HTW)

SAFETY CONTEXT: INJURY, FATALITIES, PROPERTY DESTRUCTION

CHEMICAL HAZARD: ACUTE & CHRONIC TOXICITY (TOXIC/CARCINOGEN)

B. RELEASE MECHANISM

UNCONTROLLED DETONATION; EXPLOSION, FIRE, CHEMICAL REACTION

ENVIRONMENTAL PROCESS: VOLATILIZATION; WIND MOBILIZATION; LEACHING TO GROUNDWATER

C. TRANSPORT PATH THROUGH ENVIRONMENTAL MEDIUM

AIR PATHWAY: (VAPOR/PARTICULATE) DISPERSION;

SOIL PATHWAY: PHYSICAL DISPLACEMENT; LEACHING

GROUNDWATER PATHWAY: CONVECTION; DIFFUSION

D. HUMAN OR ENVIRONMENTAL RECEPTOR

SUGGESTED HAZARD RANKING SYSTEM FACTORS

EARLY RECOGNITION OF THE OBJECTIVE OF THE HRS

TO PRIORITIZE FUNDING

RANK SITES BY LEVEL OF HAZARD

ADDRES SITES BY LEVEL OF PUBLIC SENSITIVITY

RANK BY FEASIBILITY OF RESTORATION

PATHWAY EVALUATION PARAMETERS

RELEASE POTENTIAL

TOXICITY/HAZARD CHARACTERISTICS

TARGET RECEPTORS

ELEMENTS OF THE HAZARD RANKING SYSTEM

1. LIKELIHOOD OF RELEASES (LR)

2. HAZARD (TOXICITY) CHARACTERIZATION (HTC):

   SAFETY FACTORS
   TOXICITY FACTORS

3. HUMAN AND ENVIRONMENTAL FACTORS (TR)

4. INSTITUTIONAL CONSTRAINTS (IC)

PRELIMINARY CONCLUSIONS

* IT IS ESSENTIAL TO MOUNT AN IN-DEPTH EFFORT TO DEVELOP A DETAILED SITE HISTORY TO MAXIMIZE EFFECTIVENESS OF HRS.

* CONTAINERIZATION CHARACTER IS THE MOST DOMINANT FACTOR FOR DETERMINATION OF THE HAZARDOUS CHARACTER OF THE FUDS.

* SITE CHARACTERIZATION EFFORT SHOULD BE USEFUL IN IMPLEMENTING A PRELIIMINARY PRIORITIZATION OF THE FUDS SITES.

* MINIMIZATION AND ELIMINATION OF SAFETY HAZARDS ARE THE MOST CRITICAL OBJECTIVE OF THE HRS.

* INSTITUTIONAL CONSTRAINTS MAY MAKE ANY RESTORATION EFFORT INFEASIBLE.

* PUBLIC SENSITIVITY ISSUES MAY OVERWHELM THE SCORING PROCESS, THUS CHANGING THE RANKING OF THE SITES.

* IT IS NECESSARY TO DEVELOP A DECISION-MATRIX THAT IDENTIFIES MAJOR GOALS OF THE HRS; PROVIDES SITE-SPECIFIC GUIDANCE FOR STRUCTURING THE SCORING SYSTEM; AND, ADDRESSES SOCIO-POLICICAL ISSUES.

* ANY HRS DEVELOPED FOR UXO/CSM/HTW SITES WILL BE SIGNIFICANTLY DIFFERENT THAN THE CERCLA HAZARD RANKING SCORING.